

WHAT IS CLAIMED IS:

1. A shoe defining a normal walking direction and comprising a sole defining a forward region positioned beneath toes and at least part of a ball of a foot received within the shoe and having a lower surface exposed across the forward region to engage a supporting surface for walking thereon; and
- 5 a roller secured to the sole and disposed rearward of the forward region, the roller mounted to rotate about an axle defining a primary axis of rotation extending at an angle of between about zero and 45 degrees to the walking direction, as viewed from above the shoe, for rolling sideways along a support surface.
- 10 2. The shoe of claim 1 wherein the roller is removable.
3. The shoe of claim 1 wherein the roller is retractable.
4. The shoe of claim 1 wherein the sole is flexible for bending during walking.
- 15 5. The shoe of claim 1 wherein the roller forms a lowermost portion of the shoe.
6. The shoe of claim 1 wherein the axle is mountable to the sole in a plurality of selectable axis orientations.
- 20 7. The shoe of claim 6 wherein, in one of the axis orientations, the axle defines an alternate axis of rotation extending substantially perpendicular to the walking direction.
8. The shoe of claim 1 wherein the shoe comprises two such rollers.
- 25 9. The shoe of claim 8 wherein the two rollers are spaced apart laterally across the sole.
10. The shoe of claim 9 wherein centers of the two rollers have a lateral spacing of about 20 percent of an overall length of the sole.

11. The shoe of claim 8 wherein the two rollers are spaced apart along the walking direction.

5 12. The shoe of claim 11 wherein midplanes of the two rollers are spaced apart along the walking direction by a distance of about 30 percent of an overall length of the sole.

10 13. The shoe of claim 11 further comprising a grinding surface disposed between the rollers and defining a laterally extending channel for receiving a rail.

14. The shoe of claim 13 wherein the grinding surface comprises a circumferential surface of a rolling member.

15 15. The shoe of claim 13 wherein the grinding surface is rigidly secured to the sole of the shoe

16. The shoe of claim 1 wherein the sole defines a cavity having an opening at the lower surface of the sole, the roller being partially disposed within the cavity and extending through the cavity opening.

20 17. The shoe of claim 16 wherein the roller axle is mounted to a support cup spanning the roller and disposed within the sole cavity.

18. The shoe of claim 17 wherein the support cup is removable from the sole
25 cavity.

19. The shoe of claim 17 wherein the support cup, roller and axle are removable from the sole cavity as a unit.

20. The shoe of claim 17 wherein the support cup is selectively positionable in the cavity in a first position for rolling, in which the roller extends through the cavity opening, and a second position for walking, in which the roller is fully recessed within the cavity.

5 21. The shoe of claim 20 wherein the cup encloses the roller within the cavity in said second position for walking.

22. The shoe of claim 1 wherein the roller is elongated.

10 23. The shoe of claim 1 wherein the roller is barrel-shaped.

24. The shoe of claim 1 wherein the roller comprises a wheel.

15 25. The shoe of claim 1 wherein the roller contains a bearing supporting the roller on the axle.

26. The shoe of claim 25 wherein the bearing contains rolling elements.

27. The shoe of claim 1 wherein the roller is cylindrical.

20 28. The shoe of claim 1 wherein the roller is disposed in an arch region of the sole.

25 29. The shoe of claim 1 wherein the roller defines a rolling surface spanning a distance of at least 2.0 inches (5 centimeters) along the sole.

30. The shoe of claim 29 wherein the rolling surface spans a distance of at least about 2.5 inches (6.3 millimeters) along the sole.

30 31. The shoe of claim 29 wherein the rolling surface spans at least about 15 percent of an overall length of the shoe.

32. The shoe of claim 31 wherein the rolling surface spans at least about 20 percent of an overall length of the shoe.

5 33. The shoe of claim 32 wherein the rolling surface spans at least about 25 percent of an overall length of the shoe.

10 34. The shoe of claim 1 wherein the axle is secured to the sole through a compliant mount that allows tilting of the axle with respect to the sole to vary direction of travel while rolling upon the roller.

35. The shoe of claim 1 wherein the axle defines a canted kingpin axis about which the axle rotates to induce yaw with respect to a rolling direction.

15 36. The shoe of claim 35 wherein the axle is secured to the sole through a compliant mount that resiliently deforms as the axle is rotated about its kingpin axis.

20 37. The shoe of claim 35 wherein the axle carries two rollers, one disposed on either side of the kingpin axis.

38. The shoe of claim 37 wherein the rollers are cylindrical.

25 39. The shoe of claim 37 wherein the rollers are mounted for rotation about the axle through separate bearings containing rolling elements.

40. The shoe of claim 37 wherein a fore-aft distance between midplanes of the rollers is about 3.0 inches (76 millimeters).

30 41. The shoe of claim 40 wherein the fore-aft distance between midplanes is about 30 percent of an overall length of the sole.

42. The shoe of claim 35 wherein the kingpin axis is defined in part by a pin of the axle disposed for rotation within a socket of axle mounting structure secured to the sole.

5 43. The shoe of claim 35 wherein the axle is disposed in an arch region of the sole, between the forward region and an exposed heel region of the sole.

10 44. The shoe of claim 35 wherein the axle is selectively removable from the sole for walking.

15 45. The shoe of claim 35 wherein the shoe further comprises a roller mounted to rotate about a fixed axle laterally spaced from the axle with the canted kingpin axis.

20 46. The shoe of claim 45 wherein the fixed axle is disposed on a side of the kingpin axis facing an inner side of the shoe.

25 47. The shoe of claim 35 comprising at least two rollers, each mounted for rotation about corresponding, independent axles, each axle defining a canted kingpin axis about which the axle rotates to induce yaw with respect to a rolling direction, the axles spaced apart laterally across the sole.

30 48. The shoe of claim 47 wherein each axle carries two rollers, one disposed on either side of its kingpin axis.

49. The shoe of claim 47 wherein the two rollers together define a wheelbase of
25 about 20 percent of an overall length of the shoe.

50. The shoe of claim 47 wherein each kingpin axis extends upward toward an adjacent side of the shoe.

30 51. The shoe of claim 35 wherein both axles and their associated rollers are completely disposed within a shoe width defined by the exposed forward region of the sole.

52. The shoe of claim 1 wherein the roller defines at least two support surface contact points separated by at least 1.5 inches (38 millimeters).

5 53. The shoe of claim 52 wherein the contact points are defined on a single rolling member.

10 54. The shoe of claim 53 wherein the rolling member is shaped to engage a flat, horizontal supporting surface at one of the contact points in a first roller tilt direction, and the other of the contact points in a second roller tilt direction.

55. The shoe of claim 53 wherein the rolling member is shaped to engage a flat, horizontal supporting surface at both contact points simultaneously.

15 56. The shoe of claim 52 wherein the contact points are defined on at least two independently rotatable rolling members.

20 57. A shoe defining a normal walking direction and comprising a sole defining a forward region positioned beneath toes and a ball of a foot received within the shoe and having a lower surface exposed across the forward region to engage a supporting surface for walking thereon; and a roller secured to the sole and disposed rearward of the forward region, the roller mounted to rotate about an axle defining a primary axis of rotation non-perpendicular to the walking direction as viewed from above the shoe.

25 58. A shoe defining a normal walking direction and comprising a sole with a lower surface exposed for engaging a supporting surface for walking thereon, the sole defining a cavity having an opening at the lower surface of the sole; and a roller partially disposed within the cavity and extending through the cavity opening; 30 wherein the roller is mounted to rotate only about a primary axis of rotation for rolling along a support surface in a direction other than the walking direction.

59. A shoe having a heel portion and a toe portion defining a normal walking direction, and a flexible sole with a lower surface exposed for engaging a supporting surface in a walking mode;

5 the sole defining a cavity extending into the sole rearward of the toe portion from an opening at said lower surface and at least partially containing a removable roller extending through the opening for rolling against the supporting surface in a rolling mode;

wherein the roller is mounted to rotate about an axis extending at an angle of between about zero and 45 degrees to the walking direction, as viewed from above the shoe.

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60. A rolling shoe having a sole and comprising a steerable truck assembly comprising a pair of rollers mounted to rotate about an axle secured to the sole through a compliant mount that allows tilting of the axle with respect to the sole to vary direction of travel while rolling upon the roller; and

15 a non-steerable roller mounted to rotate about a fixed axle laterally spaced from the axle of the steerable truck assembly.

20 61. A method of personal locomotion, comprising donning a pair of shoes each defining a normal walking direction and comprising a sole defining a forward region positioned beneath toes and at least part of a ball of a foot received within the shoe and having a lower surface exposed across the forward region to engage a supporting surface for walking thereon; and

25 a roller secured to the sole and disposed rearward of the forward region, the roller mounted to rotate about an axle defining a primary axis of rotation extending at an angle of between about zero and 45 degrees to the walking direction, as viewed from above the shoe, for rolling sideways along a support surface;

accelerating in a desired direction corresponding to the normal walking direction by engaging the forward regions of the soles against a support surface; and then

30 repositioning the shoes to engage the rollers against the support surface, to roll in the desired direction at an angle to the normal walking direction defined by the shoes.

62. The method of claim 61 wherein the support surface comprises a sidewalk.

63. The method of claim 61 wherein the step of accelerating comprises walking upon the forward regions of the shoe soles.

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64. The method of claim 61 wherein the step of accelerating comprises running upon the forward regions of the shoe soles.

65. The method of claim 61 wherein the shoes are repositioned to roll in a direction substantially perpendicular to the normal walking direction defined by the shoes.

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66. The method of claim 61 wherein the step of repositioning comprises lifting each shoe from the support surface, rotating the shoe away from the direction of acceleration, and then engaging the roller upon the support surface.

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